REMARKS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1, 2, and 4-18 are presently pending in the present application. Claims 1, 2, and 4-6 have been amended and Claims 7-18 have been added by way of the present Amendment. Claim 3 has been canceled without prejudice or disclaimer. No new matter has been entered.

In the outstanding Official Action, Claim 6 was object to as being an improper multiple dependent claim. The claims have been amended such that no multiple dependent claim depends from another multiple dependent claim. Accordingly, the Applicants respectfully request the withdrawal of the claim objection.

Claims 1-5 were rejected under 35 U.S.C. §103(a) as being unpatentable over European Patent 1,219,580 (EP '580) in view of Japanese 09-221367 (JP '367). For the reasons discussed below, the Applicants request the withdrawal of the obviousness rejection.

The basic requirements for establishing a *prima facie* case of obviousness as set forth in MPEP §2143 include (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, (2) there must be a reasonable expectation of success, and (3) the reference (or references when combined) must teach or suggest all of the claim limitations. The Applicants submit that a *prima facie* case of obviousness cannot been established in the present case because the cited references, either when taken singularly or in combination, do not teach or suggest all of the limitations recited in amended independent Claim 1.

Claim 1 of the present application recites a ceramic member for a centrifugal sintering

device, which is a member consisting of a rotor, a shaft or a sample holder to be used in a centrifugal sintering device imparting a centrifugal force field to and indirectly heating a molded body of ceramics or metal powder or a ceramic precursor film by selectively causing only the rotor and/or the sample holder to self heat using an induction heating device, the rotor which turns the sample holder, the shaft or the sample holder is composed of ceramics, and these rotor, shaft and sample holder undergo no thermal deformation and are not damaged by thermal stress when subjected to centrifugal force of 10 to 700,000 G under conditions of atmospheric temperatures of 300 to 1200°C, wherein said rotor which turns said sample holder and/or said sample holder are composed of conductive silicon carbide ceramics.

The Official Action cites rotary disc (8) described in the EP '580 reference for the teaching of the claimed ceramic member configured as a sample holder, a rotor, or shift. Paragraph [0024] of the EP '580 reference describes that rotary disc (8) may be made of a ceramic and may include a ceramic rotary shaft; however, the EP '580 reference does not specify the type of ceramic. Thus, the EP '580 reference does not disclose the use of silicon carbide ceramics, or a rotor and/or a sample holder that are composed of conductive silicon carbide ceramics as recited in amended Claim 1. The EP '580 reference also does not mention the use of induction heating.

The Official Action attempts to supplement the teachings of the EP '580 reference with teachings in the JP '367 reference, which describes a conductive silicon carbide material.

As noted above, paragraph [0024] of the EP '580 reference teaches that disc (8) may be made of a ceramic and may include a ceramic rotary shaft; however, the EP '580 reference teaches nothing about silicon carbide material, such as conductive silicon carbide material.

The EP '580 reference merely teaches that the disc (8) may be made of a <u>ceramic</u> and may be include a <u>ceramic</u> rotary shaft.

On the other hand, the JP '367 reference teaches the production of conductive silicon carbide material <u>composite material</u>. The JP '367 reference teaches a specific composite material of conductive silicon carbide that has high toughness and intensity, and can have varying resistance values. More specifically, the JP '367 reference teaches a specific composite material of conductive silicon carbide that includes mixed powder 100 weight section including silicon carbide 60-95 volume%, any one or more of titanium, zirconium, niobium and tantalium 5-40 volume%, and carbon or a compound containing carbon 0.5-10 weight section, which are sintered to obtain the material. However, the JP '367 reference teaches nothing about technologies relating to an apparatus using centrifugal force in a centrifugal sintering device, and thus does not teach a ceramic member for such a centrifugal sintering device. The JP '367 reference also does not mention the use of induction heating.

Thus, the cited references, either when taken singularly or in combination, do not teach or suggest a ceramic member for a centrifugal sintering device that imparts a centrifugal force field to and indirectly heats a molded body by selective self heating using an induction heating device, where the ceramic member is a rotor, a shaft, or a sample holder composed of ceramics that undergoes no thermal deformation and no damage by thermal stress when subjected to centrifugal force of 10 to 700,000 G under conditions of atmospheric temperatures of 300 to 1200°C, and wherein the rotor and/or the sample holder are composed of conductive silicon carbide ceramics, in the manner recited in Claim 1. Neither reference discloses the use of induction heating, and thus the references nor the knowledge in the art at the time of the invention do not provide a reason for modifying specific elements taught in the EP '580 reference to include the claimed material, absent hindsight. Furthermore, it is not

clear from the JP '367 reference whether the material described therein, which is a specific composite material intended to provide, among other things, appropriate resistance for use as an electrical conductor, would be able to withstand the conditions set forth in Claim 1 in a centrifugal sintering device.

By way of background, the present inventors noted that ability of a centrifugal sintering device to operate for long durations was frequently determined by the bearing, and the operating conditions under which it operated. For example, if whole of the chamber of the centrifugal sintering device is heated, then the amount of heat leaked out from the rotary shaft to the bearing is very large and the temperature of the bearing raises to very high levels, and thereby, clearance of the bearing becomes largely misaligned, which causes vibration and abrasion to the ball bearings of the bearing. In order to solve these problems, the inventors discovered that it is extremely effective to heat around the sample by indirect, partial heating, and thereby reducing the temperature increase at the bearing. The inventors have found that the partial heating of the sample holder and/or rotary shaft made of the conductive silicon carbide increases the ability of the apparatus for sintering using centrifugal force and the durability of the apparatus.

The Applicants submit that the cited references, either when taken singularly or in combination, fail to disclose or suggest all of the limitations recited in independent Claim 1. Thus, the Applicants respectfully request the withdrawal of the obviousness rejection of independent Claim 1.

Claims 2, and 4-6 are considered allowable for the reasons advanced for Claim 1 from which they depend. These claims are further considered allowable as they recite other features of the invention that are neither disclosed nor suggested by the applied references when those features are considered within the context of Claim 1.

Newly added Claims 7-18 also recited features that are neither disclose nor suggested by the cited reference, either when taken singularly or in combination. For example, independent Claim 7 recites a ceramic member for a centrifugal sintering device configured to impart a centrifugal force to and indirectly heat a sample using an induction heating device, said ceramic member comprising a sample holder, a rotor, or a shaft, wherein said sample holder, said rotor, or said shaft is configured to not thermally deform and to not be damaged by thermal stress when subjected to centrifugal force of 10 to 700,000 G under conditions of atmospheric temperatures of 300 to 1200°C, and wherein said sample holder, said rotor, or said shaft is composed of silicon carbide ceramics. For reasons similar to those discussed above with respect to Claim 1, Claim 7 and the claims that depend therefrom are believed to be in condition for allowance. Additionally, independent Claim 10 recites a centrifugal sintering device comprising a sample holder configured to hold a sample; a rotor attached to said sample holder; a shaft attached to said rotor; a rotation device configured to rotate said shaft and impart a centrifugal force to said shaft, said rotor, and said sample holder; and an induction heating device configured to indirectly heat the sample, wherein said sample holder, said rotor, or said shaft is composed of silicon carbide ceramics. As noted previously, neither of the cited references, singularly or in combination, describes an induction heating device. Thus, Claim 10 and the claims that depend therefrom are believed to be in condition for allowance.

Consequently, in view of the above discussion, it is respectfully submitted that the present application is in condition for formal allowance and an early and favorable reconsideration of this application is therefore requested.

Respectfully Submitted,

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